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㉚ A closure for bottles and the like of the type including a breakable bottom reservoir to break during use.

㉛ This invention relates to a closure for bottles and the like of the crown-cap type including a reservoir (2) with breakable bottom (3), having a piercing plunger (8) made in a unitary body with an over cap (1) and entering said reservoir (2) by a slantwise cut end (9), the skirt of said cap being internally provided with continuous or discontinuous ridges (12) for engagement with the edge of the bottle inlet, said skirt (10) also having provided thereon a tearing removable strip (15), internally carrying continuous or discontinuous ridges (15') for abutment with the top portion of an annular flange (6), carried at the top by said reservoir.

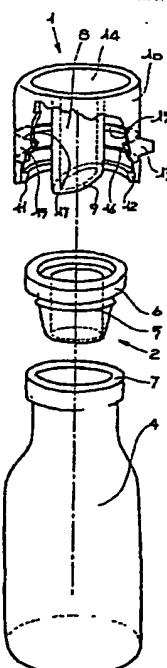


Fig. 1

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A closure for bottles and the like of the type including  
a breakable bottom reservoir to break during use

This invention relates to a closure for bottles and the like, of the type including a reservoir housed within the bottle neck and containing a material, generally as a powder, which is allowed to drop into the liquid in the bottle by breakage of the bottom in said reservoir.

The bottom breakage is effected by pressure exerted on the presser member of cylindrical shape, entering the reservoir by a slantwise cut end, this operation being carried out according to known techniques following the opening of a guarantee aluminum or also plastic crown-cap.

In this known arrangement, shown in the Italian Patent Application n. 51184 A/76, the presser member is made together with the reservoir, and the whole is placed on the bottle neck, the guarantee crown-cap being successively applied by rolling about said neck.

However, such a closure has substantial disadvantages, some of which will be hereinafter illustrated.

A first disadvantage consists of the difficulty in removing an aluminum crown-cap rolled about the bottle neck, operation which very often causes wounds to the operator's hands and which cannot always be manually carried out.

5

Known plastic crown-caps, as used to this end, also require complicated operations for removal thereof, because of tending to remain entrapped about the bottle neck.

- 10 Upon removal of the guarantee crown-cap, the cylindrically shaped presser member is acted upon, which member will be in the following simply referred to as piercing plunger, for the breakage of the reservoir bottom in which it is housed.
- 15 The reservoir content, generally powdery material, is then allowed to fall down into the bottle, mixing with the liquid material therein. Thus, in order to use the mixture thereby obtained, the bottle inlet has to be freed, by removing said reservoir which together with the piercing plunger
- 20 remains embedded within the bottle neck. This is also a difficult manual operation because of the poor available gripping and high seal or friction between the reservoir and bottle, so that the aid of mechanical means is often resorted to, such as for example a suitable tool acting as a le-
- 25 ver between the respective contact edges of the bottle and reservoir inlet.

Therefore, it clearly appears that the above described known closure, as well as other closures which have not been herein 30 mentioned for the sake of brevity, but which do not anyhow

show substantial differences as to functionality from that shown, have a poor practicability and require quite complicated operations for the removal thereof.

- 5 It is the object of the present invention to obviate to the above mentioned disadvantages, by providing a closure for bottles and the like which on one hand is capable of offering safety against any possible casual tamperings, and on the other hand enables by simple and ready operations to
- 10 pierce through the reservoir therein contained and remove the whole from the bottle to which is it applied.

In order to achieve these objects, a closure for bottles and the like, according to the present invention and preferably of plastic material of the crown-cap type including a breakable bottom reservoir housed within the bottle neck and comprising an annular flange seating on the bottle inlet edge, and a piercing plunger, preferably of hollow type, entering the reservoir by a slantwise out end, is characterized in that said piercing plunger is made in a unitary body with the outer guarantee crown-cap and is housed internally of and coaxially therewith, the skirt of said crown-cap being internally provided with continuous and discontinuous ridges for engagement upon transitory elastic deformation with the bottle inlet edge, at its middle portion said skirt also having provided thereon a tearing removable strip defined by two circumferential parallel weakening or breaking lines, internally and at a suitable height said strip carrying continuous or discontinuous ridges for abutment with the top portion of the annular flange of said reservoir in order to avoid any casual pier

cing of the reservoir in case of casual pressures exerted on the crown-cap, and so that by removing said strip and exerting a proper pressure on the outer crown-cap, the pier 5 cing is provided for said reservoir, which remain embedded within said crown-cap and can be readily removed therewith, thus freeing the bottle inlet for use of the content of the bottle.

Further characteristics of a closure for bottles and the like according to the present invention will become apparent 10 from the following description referred to a preferred embodiment thereof, as shown in the accompanying drawings, in which:

15 Figure 1 is an exploded axonometric view with parts removed of a closure according to the present invention, showing the application thereof onto a bottle; Figure 2 is a front and partly cutaway view showing the closure of Figure 1 mounted on the bottle; and 20 Figure 3 is a view showing the same closure with the median strip removed and the reservoir pierced through by the presser member.

Referring to said figures of the accompanying drawings, re- 25 ference numeral 1 denotes a crown-cap closure preferably of plastic material, according to the present invention and including a reservoir 2 with breakable bottom 3 which is accomodated within the neck of a bottle 4.

30 Said reservoir 2, containing a generally powdery material which is allowed to fall down into the liquid in said bot-

tle 4 by piercing through of the bottom thereof, is of well known type and comprises a circumferentially continuous ridge 5 for interfering with the inner portion of the neck of said bottle 4, and an annular edge 6 overlapping the 5 annular edge 7 of the bottle neck.

Internally of and coaxially therewith said crown-cap 1 has a preferably hollow piercing plunger 8, made in a unitary body with said crown-cap, having the free end 9 slantwise 10 cut and housing in said reservoir 2.

The crown-cap 1 comprises a skirt 10 having at its lower edge 11 an inner annular ridge 12 for engagement upon transitory elastic deformation with the bottle inlet edge, as 15 shown in Figure 2.

Of course, instead of said continuous annular ridge 12, a discrete number of discontinuous ridges could be provided, still obtaining the same result, which is that to assure a 20 seal between said crown-cap 1 and bottle 4.

At the middle portion of skirt 10, and preferably at a height from the top portion of the bottle inlet edge to beyond the top portion of the annular edge 6 of reservoir 2, 25 there is provided a tearing removable strip 15, as defined by two circumferential parallel weakening or breaking lines 16 and 17, a gripping tab or tongue 13 being provided for aiding in tearing.

30 According to a feature of the present invention, said tearing removable strip 15 is internally and at a suitable height provided with at least one continuous ridge 15' (or

a plurality of discontinuous ridges) for abutment with the top portion of the annular edge 6 of the reservoir 2 and suitable to prevent the skirt 10 from vertically moving when a casual pressure is exerted on the top portion 14 of 5 the crown-cap 1, and accordingly to prevent any accidental piercing of reservoir 2.

The removal of said median strip 15 provided the separation of the lower portion 18 from the top portion 19 of the 10 skirt 10 said portion 18 remaining entrapped about the bottle neck, but falling down at its convex portion, so as to facilitate the successive lowering of the portion 19 of said skirt for piercing through said reservoir 2. Thus, upon removal of said strip 15, a suitable pressure should only be 15 exerted on the top portion 14 of the crown-cap 1 to break the breakable bottom 3 of reservoir 2 by the piercing plunger 8 which is integral with said crown-cap, said bottom 3 remaining attached for a short length to the sidewall of the reservoir at the top portion of the slantwise cut end 20 of the piercing plunger, as shown in Figure 3.

Upon piercing (Figure 3), the reservoir 2 remains embedded within the crown-cap 2, both due to friction between the outer portion of the piercing plunger 8 and the inside of 25 the reservoir, and due to friction between the edge 6 of said reservoir and the inner surface of the portion 19 of the skirt 10 of said crown-cap, so that the reservoir can be removed together with the crown-cap 1 from the bottle 4 by exerting a simultaneous tractive and torsional stress 30 on said portion 19 of skirt 10 which is to this end provided as knurled. Thus, the removal of the reservoir 2 is

greatly facilitated because of the substantial increase in gripping due to the top portion 19 of the skirt of the guarantee crown-cap.

5 It should be pointed out that the useful height of the portion 19 of said skirt is preferably greater than or equal to the distance as vertically measured between the corners of the slantwise cut end 9 of the piercing plunger 8, and this to provide a nearly complete breakage of the bottom 3 of 10 reservoir 2 and accordingly to facilitate the fall of the powdery material therein contained into the bottle 4.

Although in the figures of the accompanying drawings the lower edge 11 of the skirt 10 has been located immediately 15 below the annular edge 12, such a skirt 10 could be of course extended to bring said edge 11 in abutment with the convex portion of bottle 4.

Of course, many changes in detail can be made to the crown-20 -cap closure according to the present invention, without departing for this from the scope of the invention.

## Claims

1. A closure for bottles and the like of crown-cap type, including a reservoir (2) with breakable bottom housed within the bottle neck and comprising an annular flange (6) seating on the edge (7) of the bottle inlet, and a preferably hollow piercing plunger (8) entering said reservoir (2) by a slant-wise cut end (9), wherein said piercing plunger (8) is made in unitary body with the outer guarantee crown-cap (1) and is accommodated internally of and coaxially therewith, the skirt (10) of said crown-cap being internally provided with continuous or discontinuous ridges (12) for engagement upon transitory elastic deformation with the bottle inlet edge, said skirt (10) having provided thereon at the middle portion thereof a tearing removable strip (15), which is defined by two circumferential parallel weakening or breaking lines (16, 17) internally and at a suitable height said strip (15) carrying continuous or discontinuous ridges (15') for abutment with the top portion of the annular flange (6) of said reservoir (2), in order to avoid any accidental piercing through of the reservoir (2) in case of casual pressures being exerted on the crown-cap (1), so that by removing said strip (15) and exerting a suitable pressure on the outer crown-cap, said reservoir (2) is pierced through, which reservoir remains embedded within said crown-cap and can be readily removed therewith, freeing the bottle inlet for use of the content thereof.
2. A closure according to claim 1, wherein said reservoir (2) is embedded to the guarantee crown-cap owing to friction between the outside of the piercing plunger and the reservoir inside, and friction between the annular edge (6) of

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said reservoir and the inner surface of the top portion (19) of said crown-cap skirt (10).

3. A closure according to claims 1 and 2, wherein the height  
5 of said top portion (19) of the guarantee crown-cap skirt (10) is greater than or equal to the distance as vertically measured between the corners of the slantwise curt end (9) of said piercing plunger (8) in order to provide a nearly complete breakage of the reservoir bottom (3), the-  
10 reby facilitating the fall down of the content thereof into the underlying bottle.

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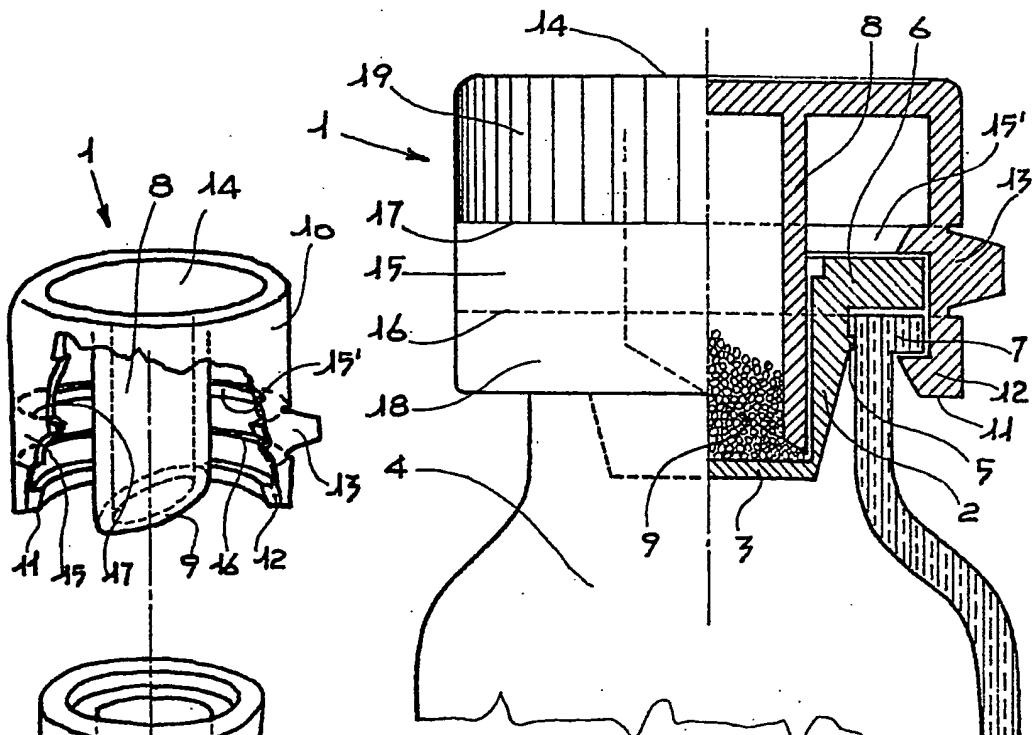


Fig. 2

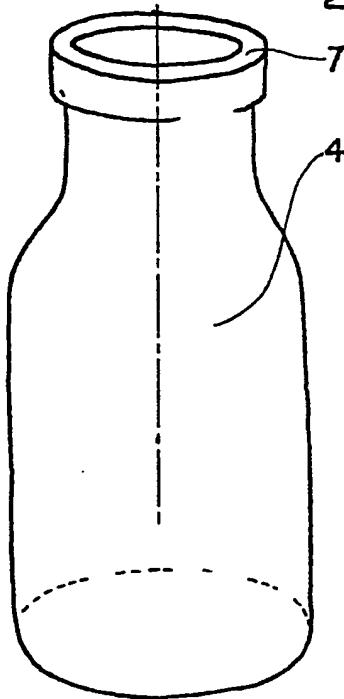
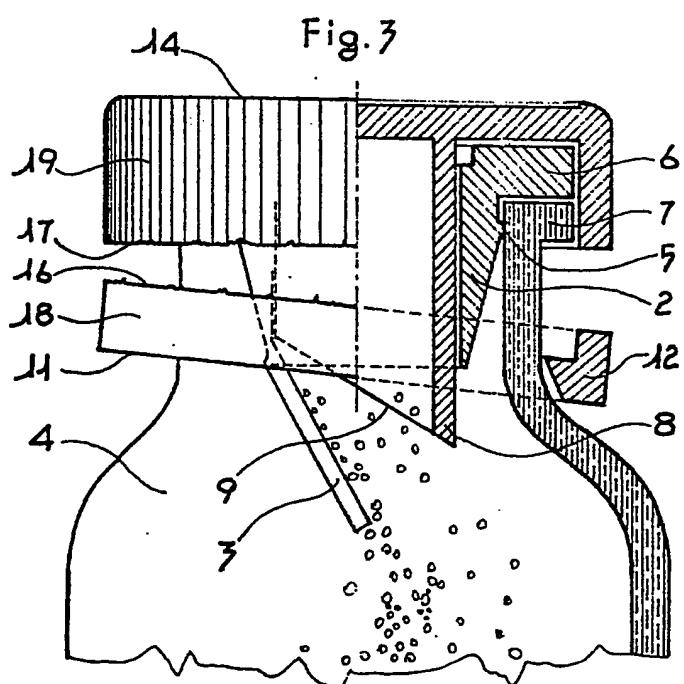


Fig. 1



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